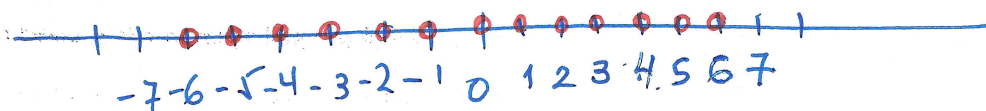




1. Find and draw the integer numbers that work:  $|x| < 7$

$-6; -5; -4; -3; -2; -1; 0; 1; 2; 3; 4; 5; 6;$



2. Work out the following and simplify the resulting value:

$$\frac{-\frac{5}{3} \cdot \frac{2}{6} + 8}{\frac{5}{3} - 4 \cdot 3}$$

$$\begin{aligned} \frac{-\frac{10}{18} + 8}{\frac{5}{3} - 12} &= \frac{-\frac{5}{9} + 8}{\frac{5}{3} - 12} = \frac{-\frac{5}{9} + \frac{72}{9}}{\frac{5}{3} - \frac{36}{3}} = \frac{\frac{67}{9}}{\frac{-31}{3}} = \frac{-67 \cdot 3}{31 \cdot 9} = \\ &= \frac{-67 \cdot \cancel{3}}{31 \cdot \cancel{3} \cdot 3} = \frac{-67}{93} \end{aligned}$$

3. Calculate the decimal value of these fractions and say what kind of fractions they are.

a)  $\frac{7}{4}$     b)  $\frac{195}{15}$     c)  $\frac{13}{3}$     d)  $\frac{3}{7}$

a)  $\frac{7}{4} = 1.75$  finite decimal

b)  $\frac{195}{15} = 13$  integer

c)  $\frac{13}{3} = 4.\overline{3}$  repeating decimal

d)  $\frac{3}{7} = 0.\overline{428571}$  repeating decimal

4. Simplify the following expression as much as possible:  $\frac{(a^2 \cdot b^3)^2 \cdot (a \cdot c^4)^3}{(a^5 \cdot b^3 \cdot c^2)^2 \cdot b^3} =$

$$= \frac{(a^2)^2 \cdot (b^3)^2 \cdot a^3 \cdot (c^4)^3}{(a^5)^2 \cdot (b^3)^2 \cdot (c^2)^2 \cdot b^3} = \frac{a^4 \cdot b^6 \cdot a^3 \cdot c^{12}}{a^{10} \cdot b^6 \cdot c^4 \cdot b^3} = \frac{\cancel{a^7} \cdot \cancel{b^6} \cdot c^{12} \cdot \cancel{8}}{\cancel{a^{10}^3} \cdot \cancel{b^6} \cdot \cancel{c^4} \cdot \cancel{4}} =$$

$$= \frac{c^8}{a^3 \cdot b^3}$$

5. Take out of the root the largest factor as much as possible and after that simplify the resulting value:

$$5\sqrt{12} + 7\sqrt{48} - \sqrt{108} - \sqrt{192} + \sqrt{243} =$$

$$= 5 \cdot \sqrt{4 \cdot 3} + 7 \cdot \sqrt{16 \cdot 3} - \sqrt{36 \cdot 3} - \sqrt{64 \cdot 3} + \sqrt{81 \cdot 3} =$$

$$= 5 \cdot 2 \cdot \sqrt{3} + 7 \cdot 4 \cdot \sqrt{3} - 6 \cdot \sqrt{3} - 8 \cdot \sqrt{3} + 9 \cdot \sqrt{3} =$$

$$= 10 \cdot \sqrt{3} + 28 \sqrt{3} - 6 \sqrt{3} - 8 \sqrt{3} + 9 \sqrt{3} =$$

$$= 33 \sqrt{3}$$

6. 10 taps fill a water tank in 4 hours.  
 a) How long does it take to fill it with 8 taps?  
 b) If it takes 1 h to fill it, how many taps are working?

a)

Taps	Time (h)
10	4
8	x

$$x = \frac{10 \cdot 4}{8} = 5h$$

b)

Taps	Time (h)
10	4
x	1

$$x = \frac{10 \cdot 4}{1} = 40 \text{ taps}$$

7. A population has increased from 75000 people to 75820 people in a year. What is the increased ratio in %?

$$\frac{75820 - 75000}{75000} = \frac{820}{75000} \stackrel{N}{=} 0.01 \text{ so } 1\%$$

8. 5 workers, working 8 hours a day, make a work in 15 days. How many hours a day would 3 workers have to spend to finish the same work in 20 days?

<u>Workers</u>	<u>Hours/day</u>	<u>Days</u>
5	8	15
3	x	20

$$x = \frac{5 \cdot 8 \cdot 15}{3 \cdot 20} = 10 \text{ hours/day}$$

9. €9900 is going to be dealt<sup>1</sup> in inversely proportional parts to the 3 first classified in a bike race, so to the numbers 1, 2 and 3. Calculate the money that belongs to each one.

$$\frac{x}{\frac{1}{1}} = \frac{y}{\frac{1}{2}} = \frac{z}{\frac{1}{3}} = \frac{9900}{1 + \frac{1}{2} + \frac{1}{3}} = \frac{9900}{\frac{6}{6} + \frac{3}{6} + \frac{2}{6}} = \frac{9900}{\frac{11}{6}} = 5400$$

$$x = 5400 \text{ €}$$

$$y = \frac{1}{2} 5400 = 2700 \text{ €}$$

$$z = \frac{1}{3} 5400 = 1800 \text{ €}$$

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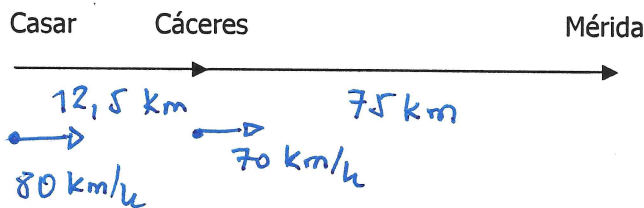
<sup>1</sup> repartido

**10.** Jorge leaves Cáceres going to Mérida in his car with a velocity of 70 Km/h and Pablo leaves Casar de Cáceres (12.5 Km to Cáceres) going to Mérida with a velocity of 80 Km/h. If the distance from Mérida to Cáceres is 75 km.

a) At what time are they going to meet?

b) Will Jorge reach<sup>2</sup> Pablo before arriving in Mérida?

(Notice you have to cross Cáceres from Casar de Cáceres to go to Mérida)



a)

$$80 - 70 = 10 \text{ km/h} \quad \frac{12'5}{10} = 1'25 \text{ h}$$

b)

$$70 \times 1'25 = 87'5 \text{ km}$$

So Pablo will not reach Jorge before.

**11.** a) When are two magnitudes in inverse proportionality? How do you get the constant of proportionality?

If the product of every related value is constant.  
By multiplying two related values.

b) Could you define?

a) Principal.

The money deposited in a bank

b) Interest.

The money that is produced by the principal.

c) Rate.

The percentage that the bank offers.

c) What is the formula of an alloy law?

$$I = \frac{\text{Weight of fine metal}}{\text{Total weight}}$$

d) What is equivalent to share some quantity into inverse proportionality?

By sharing the quantity in direct proportion to the inverse of the parts.